

What is claimed is:

1. A transfer display film comprised of a plurality of stacked layers that are prepared on, cured and lifted from a release surface and then transferred to a substrate, wherein said plurality of stacked layers comprise at least one liquid crystal layer and at least one electrically conductive layer near said liquid crystal layer.
2. A transfer display film according to claim 1 comprising a casting layer applied on or near the release surface on which other said layers of the display are prepared, said casting layer being selected from the group consisting of a preparation layer, the at least one said electrically conductive layer, an adhesive layer, a planarization layer, the at least one said liquid crystal layer, an isolation layer and combinations thereof.
3. A transfer display film according to claim 1 wherein said plurality of stacked layers are stacked in a sequence comprising a casting layer, a first said electrically conducting layer, said liquid crystal layer, and a second said electrically conducting layer.
4. A transfer display film according to claim 3 wherein at least one of said first and second electrically conducting layers comprises a transparent electrical conductor formed of a conducting polymer or carbon nanotube material.
5. A transfer display film according to claim 3 comprising an electrical insulation layer located between said first electrically conducting layer and said liquid crystal layer.

6. A transfer display film according to claim 3 comprising an electrical insulation layer between said liquid crystal layer and said second electrically conductive layer.
7. A transfer display film according to claim 1 wherein said liquid crystal layer comprises a dispersion of liquid crystal in a polymer matrix.
8. A transfer display film according to claim 3 wherein said liquid crystal layer comprises a dispersion of liquid crystal in a polymer matrix.
9. A transfer display film according to claim 3 wherein said dispersion is at least one of an emulsion and microencapsulated liquid crystal material.
10. A transfer display film according to claim 1 wherein said liquid crystal comprises cholesteric liquid crystal exhibiting planar and focal conic textures that are stable in an absence of an electric field.
11. A transfer display film according to claim 3 wherein said liquid crystal layer comprises cholesteric liquid crystal exhibiting planar and focal conic textures that are stable in an absence of an electric field.
12. A transfer display film according to claim 3 comprising an optical layer located between said casting layer and said liquid crystal layer, said optical layer being adapted to match indices of refraction of adjacent said layers.
13. A transfer display film according to claim 3 comprising a light absorbing layer located between said casting layer and said liquid crystal layer.
14. A transfer display film according to claim 3 wherein said casting layer absorbs light.

15. A transfer display film according to claim 3 comprising a protective layer located over the second electrically conducting layer that provides strength to said transfer display film.
16. A liquid crystal display comprising the transfer display film according to claim 15 wherein said protective layer is optically clear, further comprising said substrate attached to the transfer display film near said casting layer.
17. A liquid crystal display comprising the transfer display film according to claim 15 where said protective layer is optically opaque, further comprising said substrate attached to the transfer display film near said protective layer.
18. A transfer display film according to claim 1 comprising an outer adhesive layer adapted to have adhesive properties while enabling said display film to be lifted off the release surface.
19. A transfer display film according to claim 1 wherein the at least one said liquid crystal layer comprises at least one cholesteric liquid crystal dispersion layer reflective of visible or infrared electromagnetic radiation.
20. A transfer display film according to claim 19 wherein each said liquid crystal dispersion layer is reflective of a different wavelength of electromagnetic radiation.
21. A transfer display film according to claim 19 wherein the at least one said electrical conductive layer comprises a transparent electrical conductor located between adjacent said dispersion layers.

22. A transfer display film according to claim 19 wherein one said dispersion layer comprises left and right hand twist cholesteric materials, separated to prevent mixing.
23. A transfer display film according to claim 22 wherein said one dispersion layer comprises one sublayer including said left hand twist cholesteric material and another sublayer comprising said right hand twist cholesteric material.
24. A transfer display film according to claim 19 wherein the at least one said dispersion layer comprises one said dispersion layer reflective of red light, another said dispersion layer reflective of blue light and another said dispersion layer reflective of green light.
25. A transfer display film according to claim 1 wherein the at least one said liquid crystal layer comprises three generally coplanar and separated regions, a first said region comprising a plurality of droplets which contain cholesteric liquid crystal having a pitch length effective to reflect red light, a second said region comprising a plurality of droplets which contain cholesteric liquid crystal having a pitch length effective to reflect green light, and a third said region comprising a plurality of droplets which contain cholesteric liquid crystal having a pitch length effective to reflect blue light.
26. A liquid crystal display device comprising the transfer display film and said substrate of claim 1 and drive electronics that can electrically address said liquid crystal layer by applying an electric field between said electrically conductive layers effective to produce images from the display film.
27. A liquid crystal display device according to claim 26 wherein said substrate is a solar panel effective to provide a self-powering display.

28. A liquid crystal display device according to claim 26 wherein said substrate comprises a photovoltaic and a conducting layer adapted to enable said liquid crystal layer to be optically addressed by applying an electric field to said liquid crystal layer between the at least one said electrically conductive layer of said display film and said conducting layer.
29. A liquid crystal display device according to claim 26 wherein said substrate comprises an active matrix device effective to apply voltage pulses to independently drive pixels of said liquid crystal layer between the at least one said conductive layer of said display film and said active matrix device.
30. A liquid crystal display device according to claim 29 wherein said active matrix device comprises an array of thin film transistors each adapted to apply voltage pulses to effect said independent driving of pixels of said liquid crystal layer.
31. A liquid crystal display device comprising the transfer display film and said substrate of claim 1, and means for electrically addressing said liquid crystal layer between said electrically conductive layers to produce images from said liquid crystal layer.
32. A liquid crystal display device comprising the transfer display film and the substrate of claim 1, wherein said substrate comprises at least one electrically conductive layer, further comprising drive electronics for electrically addressing said liquid crystal layer between said at least one electrically conductive layer of the transfer display film and said at least one electrically conductive layer of said substrate effective to produce images from said liquid crystal layer.

33. A liquid crystal display device according to claim 32, wherein the at least one said electrically conductive layer of said transfer display film and the at least one said electrically conductive layer of said substrate contains parallel lines of row conductors and the other of the at least one said electrically conductive layer of said transfer display film and the at least one said electrically conductive layer of said substrate contains parallel lines of column conductors, said lines of row conductors being arranged orthogonal to said lines of column conductors.
34. A liquid crystal display device comprising the transfer display film and said substrate of claim 3, wherein one of said first electrically conductive layer and said second electrically conductive layer contains parallel lines of row conductors and the other of said first electrically conductive layer and said second electrically conductive layer contains parallel lines of column conductors, said lines of row conductors being arranged orthogonal to said lines of column conductors.
35. A transfer display film comprising a plurality of stacked layers that are prepared on, cured and then lifted from a release surface and then transferred to a substrate, wherein said plurality of stacked layers comprise at least one liquid crystal layer, at least one electrically conductive layer near said liquid crystal layer and means for adhering the plurality of stacked layers to a substrate.
36. A transfer display film according to claim 35 wherein said means for adhering the plurality of stacked layers to a substrate comprises a layer of adhesive.
37. A transfer display film according to claim 35 wherein said means for adhering the plurality of stacked layers to a substrate comprises a first layer adapted to bond to an adhesive layer.

38. A transfer display film according to claim 35 comprising means for addressing said liquid crystal layer between said electrically conductive layers effective to produce images from the display film.
39. A transfer display film according to claim 35 wherein the at least one said liquid crystal layer comprises a dispersion of liquid crystal in a polymer matrix.
40. A transfer display film according to claim 35 wherein the at least one said liquid crystal layer comprises cholesteric liquid crystal exhibiting planar and focal conic textures that are stable in an absence of an electric field.
41. A liquid crystal display device comprising the transfer display film and said substrate of claim 35 and means for addressing said liquid crystal layer between said electrically conductive layers effective to produce images from the display device.
42. A transfer display film comprising a plurality of stacked layers that are prepared on, cured and lifted from a release surface and then transferred to a substrate, wherein said plurality of stacked layers comprise at least one liquid crystal layer, at least one electrically conductive layer near said liquid crystal layer and an adhesive layer for adhering said plurality of layers to a substrate.
43. A lift-off display film comprising a plurality of stacked layers that are prepared on, cured and then lifted from a release surface, wherein said plurality of stacked layers comprise at least one liquid crystal layer, and at least one electrically conductive layer located near the at least one said liquid crystal layer.

44. A lift-off display film comprising a plurality of stacked layers that are prepared on, cured and then lifted from a release surface, said plurality of stacked layers comprising at least one layer of liquid crystal material, a first electrically conductive layer near a first side of one said liquid crystal layer and a second electrically conductive layer near a second side of said liquid crystal layer.
45. A lift-off display film according to claim 44 wherein said liquid crystal layer comprises a dispersion of said liquid crystal in a polymer matrix.
46. A lift-off display film according to claim 45 wherein said dispersion is at least one of an emulsion and microencapsulated liquid crystal material.
47. A lift-off display film according to claim 45 wherein said liquid crystal comprises cholesteric liquid crystal exhibiting planar and focal conic textures that are stable in an absence of an electric field.
48. A lift-off display film according to claim 44 comprising a protective layer located over at least one of said first electrically conductive layer and said second electrically conductive layer that provides strength to said lift-off display film.
49. A lift-off display film according to claim 48 wherein said protective layer is optically clear.
50. A lift-off display film according to claim 48 where said protective layer is optically opaque.
51. A lift-off display film according to claim 47 comprising a stack of said dispersion layers each reflective of visible or infrared electromagnetic radiation.

52. A lift-off display film according to claim 51 further comprising a transparent one of said electrically conductive layers located between adjacent said dispersion layers.
53. A lift-off display film according to claim 52 wherein said stack of layers comprises one said dispersion layer reflective of red light, another said dispersion layer reflective of blue light and another said dispersion layer reflective of green light.
54. A lift-off display film according to claim 47 wherein one of said first electrically conductive layer and said second electrically conductive layer comprises a plurality of row conducting electrodes arranged in substantially parallel lines on the first side of said one liquid crystal layer, and the other of said first electrically conductive layer and said second electrically conductive layer comprises a plurality of column conducting electrodes arranged in substantially parallel lines on the second side of said one liquid crystal layer, said lines of row conducting electrodes and said lines of column conducting electrodes being oriented substantially perpendicular to each other.
55. A lift-off display film according to claim 54 comprising at least one additional liquid crystal layer.
56. A lift-off display film according to claim 55 comprising conducting electrodes disposed on opposite sides of the additional liquid crystal layer, whereby said additional liquid crystal layer is independently electrically addressable.